

540, 279

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
8 July 2004 (08.07.2004)

PCT

(10) International Publication Number
WO 2004/057685 A2

(51) International Patent Classification⁷: **H01L 51/20**, 51/30, G06N 3/12, G11C 13/02

(21) International Application Number: **PCT/CA2003/001589**

(22) International Filing Date: 15 October 2003 (15.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 60/435,276 23 December 2002 (23.12.2002) US

(71) Applicant (*for all designated States except US*): UNIVERSITY OF SASKATCHEWAN TECHNOLOGIES INC. [CA/CA]; Room 304, Kirk Hall, The University of Saskatchewan, 117 Science Place, Saskatoon, Saskatchewan S7N 5C8 (CA).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): LEE, Jeremy, S. [CA/CA]; University of Saskatchewan Technologies Inc., Room 304, Kirk Hall, The University of Saskatchewan, 117 Science Place, Saskatoon, Saskatchewan S7N 5C8

(CA). KRAATZ, Heinz-Bernhard [DE/CA]; 1111 - 7th Street East, Saskatoon, Saskatchewan, S7H 0Y9 (CA). WETTIG, Shawn, D. [CA/CA]; 1327 Konjowski Road, Saskatoon, Saskatchewan S7S 1L5 (CA). SKINNER, Ryan, John [CA/CA]; 1560 1st Street East, Prince Albert, Saskatchewan, S6V 0E7 (CA).

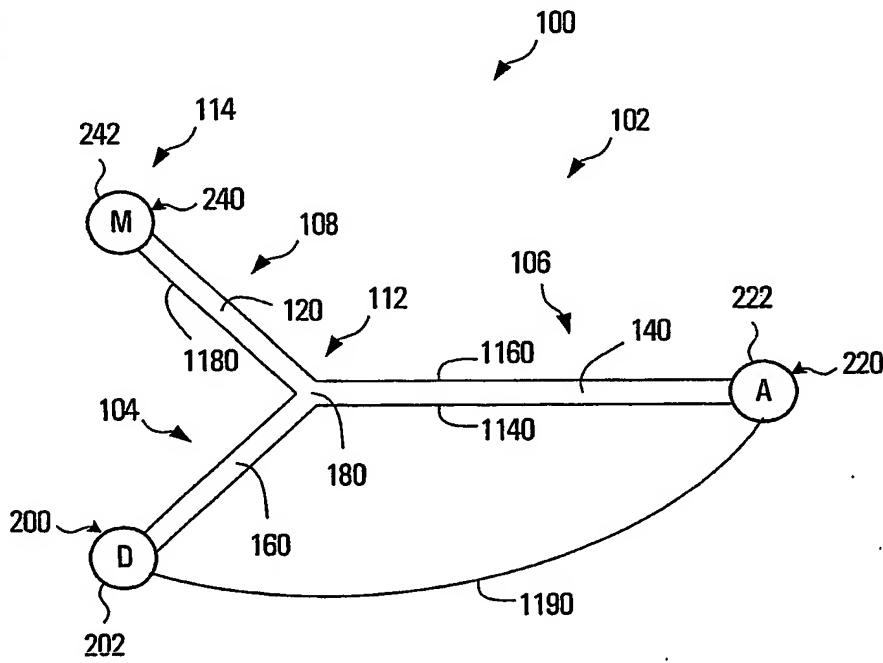
(74) Agent: SMART & BIGGAR; Box 11560, Vancouver Centre 2200-650 West Georgia Street Vancouver, British Columbia V6B 4N8 (CA).

(81) Designated States (*national*): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, EG, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK (utility model), SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: CHEMICAL SWITCHING OF NUCLEIC ACID CIRCUIT ELEMENTS



(57) Abstract: Organic circuit elements and organic conductors are disclosed, together with electron acceptors and donors that may be chemically modified to alter the conductivity of the circuit or organic conductor. An organic circuit element includes a plurality of members, each of which includes an oligonucleotide duplex. The plurality of members includes at least one donor member for receiving conduction electrons from an electron donor, at least one acceptor member for communicating with an electron acceptor to provide a region of attraction for the conduction electrons, and at least one regulator member intersecting with at least one of the plurality of members to define at least one electric field regulation junction, for cooperating with an electric field regulator to regulate an electric field at the junction.

WO 2004/057685 A2

A method of regulating an electronic signal between first and second locations in a conductive nucleic acid material includes chemically modifying an electron acceptor or an electron donor that is coupled to the conductive nucleic acid material.



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

- *without international search report and to be republished upon receipt of that report*